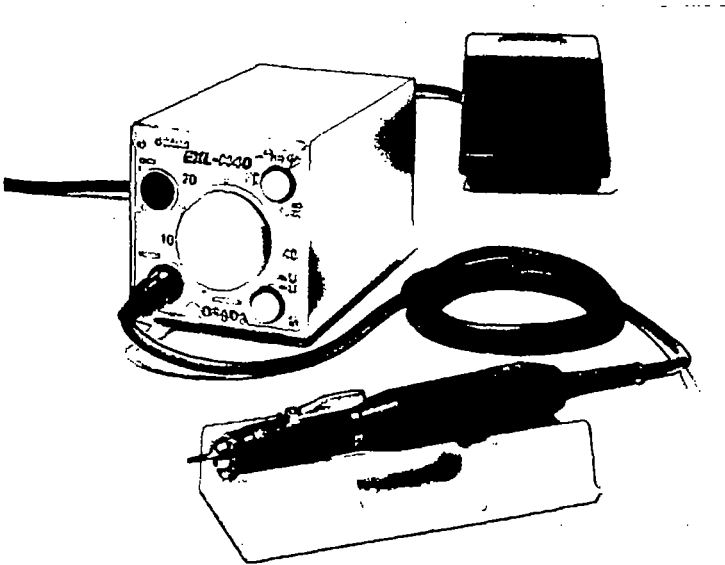


OPERATOR'S MANUAL

OSADA EXL-M40

**Electric Laboratory Handpiece System
with BRUSHLESS MICROMOTOR**



OSADA, INC.

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**Please read this owner's manual thoroughly
before operating your new EXL-M40.**

The OSADA EXL-M40 Brushless Micromotor System for laboratory applications is designed as a complete unit consisting of the EXL-M40 Power Console, MVFP Variable Speed Foot Pedal with magnetic sensor and LHP12/L12M-MC12 Brushless Micromotor handpiece assembly with motorcord.

The Brushless Micromotor System is completely different from conventional micromotors with carbon brushes. The L12M brushless micromotor is completely sealed and is virtually maintenance-free because there are no carbon brushes that will wear.

The EXL-M40 (1,000-40,000 min^{-1}) Brushless Micromotor System is extremely quiet and smooth, unlike any other. The microprocessor controlled feedback circuitry provides deceptively powerful performance. A maximum of 25,000 min^{-1} (rpm) is sufficient to accomplish most laboratory tasks. The easy-to-see Blue Beam on the speed dial shows the maximum speed selected for the foot pedal and also warns the user of abnormal conditions and reverse rotation.

Please use as directed. Any alteration or substitution of any part of the unit may cause serious damage and will void the warranty.

TIPS FOR ELECTRIC HANDPIECE USERS

- **KEEP THE AIR AROUND YOU CLEAN**
- Use a good vacuum system while working.
- Keep away loose material (including your hair).
- Maintain a clean work area.
- **WORK IN A COMFORTABLE POSITION**
- Set up the power console, foot pedal and handpiece assembly so that you can work comfortably.
- Wear safety equipment as needed.
- **LEARN A SAFE RANGE OF SPEED FOR EACH TASK. AVOID HIGH SPEED.** Please remember, *the larger the bur head, the slower the rotational speed.*
- Use new burs with sharp blades and straight shanks.
- Use the lowest speed range recommended for each bur.
- Use light pressure against the object you are cutting to let the bur do the cutting.
- **KEEP THE HANDPIECE ASSEMBLY (ESPECIALLY THE CHUCK AREA) FREE OF DEBRIS BY DUSTING OFTEN WITH A TOOTHBRUSH.**

SPECIFICATIONS

Model OSADA EXL-M40

Primary Voltage	120 Volts AC (or 220-240 Volts)*
Primary Frequency	50/60 Hz 40 VA
Wattage or Voltage/Amp	12 Watts or 12 VA
Current	3 Amp

Model L12M BRUSHLESS MICROMOTOR

Voltage	AC 30 Volts
Variable Speed	1,000 min^{-1} through 40,000 min^{-1}
Torque	4.8 Ncm
Maximum Torque	8 Ncm at 30,000 min^{-1}
Wattage	90 Watts

RPM is now indicated as min^{-1} (international standard)

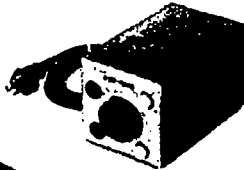
*Optional 220-240 Volt units are available.

MAJOR COMPONENTS

C: LHP12 Handpiece
Assembly
LHP12/L12M-MC12



A: EXL-M40
Power Console

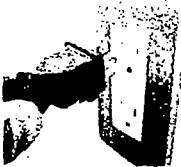


B: MVFP Foot Pedal with
Magnetic Sensor

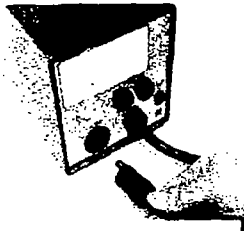
SETTING UP

Model OSADA EXL-M40

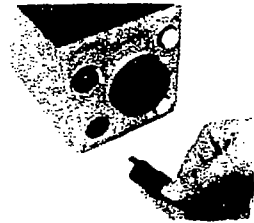
PARTS	DO	DO NOT/Avoid
Power Console (Compact but heavy; handle with care)	Place it on a safe flat surface.	Avoid high temperature, high moisture, dust, or loose material.
Power Cord with 3-prong plug	Plug into the nearest 120V outlet.	Do not overextend cord to reach outlet.
Foot Pedal and cord with plug (Hold the plug with the RED mark up.)	Place foot pedal on the floor and connect cord to receptacle on the back of the power console.	Avoid dirty/dusty floor. Do not overextend cord to reach power console. Do not pull the cord to disconnect.
Handpiece Assembly including cord: (LHP12/L12M-MC12) Place it on the handpiece holder or on a safe, level surface.	Hold the plug with the RED mark up. Connect the plug to the receptacle on the back of the power console.	Avoid rough handling. Do not pull the motorcord to disconnect. Avoid uneven surfaces or letting the handpiece fall or drop. Avoid loose materials that may become entangled with the bur.



Connect the 3-prong power cord plug of the Power Console into the nearest 120V wall socket.



Hold the Foot Pedal cord plug with the RED mark up. Push it into the receptacle on the back of the Power Console.



Hold the Handpiece motorcord plug with the RED mark up. Push it into the receptacle on the front of the Power Console.

OSADA EXL-M40 Components

#	COMPONENTS	MODEL	Dimensions mm	Weight
A	Power Console	EXL-M40	100 x 185 x 105 mm	2.9 Kg
B	Variable Speed Foot Pedal	MVFP	100 x 170 x 77 mm Cord Length: 1800 mm	530 g
C	Handpiece & Micromotor	LHP12 & L12M	$\Phi 26.5$ mm x 137 mm long $\Phi 1.1" \times 5.1/2"$ long	175 g
C1	Motorcord	MC12	180 cm (6 ft)	125 g
D1	Rubber Handpiece Holder	RHH	145 x 70 x 30 mm	270 g
D2	Fuse (2 per Unit)	3A	2 installed & 2 spare	
D3	Cord Holder Clamp	Clamp	30 x 30 x 30 mm	
D4	Chuck Remover See Page 11	Chuck Wrench	40 mm-50 mm long (with guide bur), $\Phi 12$ mm	
D5	Spindle Holder to hold spindle	Spindle Holder	20 x 16 x 13 mm	
D6	Cleaning Brush	Brush	70 mm	
X	Removable Chuck installed & optional	3 shank sizes	Standard $\Phi 2.35$ mm Optional: $\Phi 1.6$ & $\Phi 3.0$	



D1 Rubber Handpiece Holder



D2 Fuse (3A)
installed (2)
and spare (2)



D3 Cord Holder Clamp



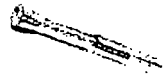
D4 Chuck Wrench



D5 Spindle Holder



D6 Cleaning Brush



X Standard Chuck
(installed in the
handpiece)

User safety is always Osada's first priority in the design of its handpiece units.

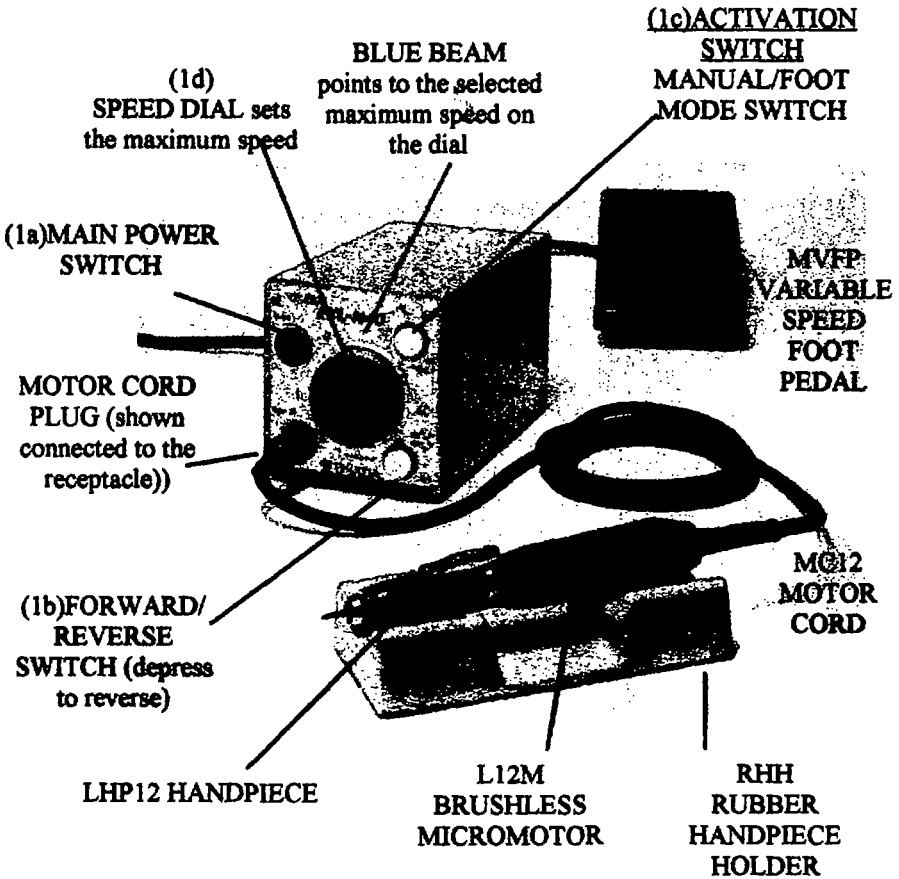
EXL-M40 Safety Devices

BLUE BEAM WARNING SIGNALS

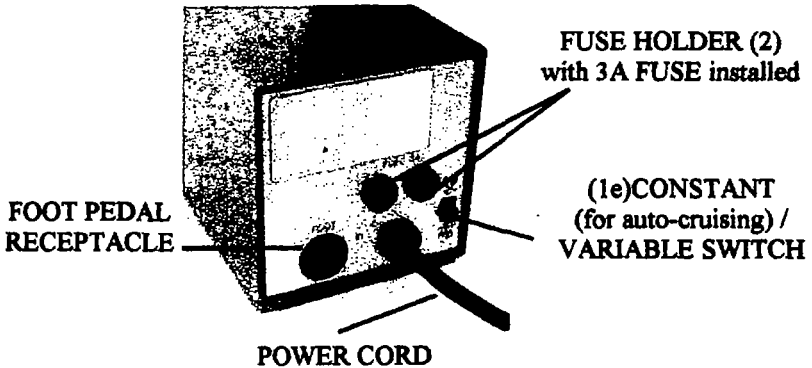
- **PULSATING BLUE BEAM** indicates bur rotation is in reverse direction, whereas a steady beam indicates forward direction. Normally blades are made to cut in forward rotation.
- **RAPIDLY PULSATING BLUE BEAM** indicates that an irregularity has occurred and ceased the operation.
- 1) **Irregular procedure:** If you turn the main switch on while the activation (Manual/Foot mode) switch is in the Manual mode, no activation occurs to prevent unintended activation. Turn to Foot mode and try again. Similarly, in the Foot mode, if you turn the main switch on while depressing the foot pedal, activation will not occur.
- 2) **Irregular rotation or no rotation due to abnormal stress or high temperature:** If the handpiece has tangled material, clogged bearings, or irregular assembly, the micromotor will stop rotation. Remedy any obvious causes. If high temperature seems to be the only cause, turn the Mode switch to Foot for off position, wait for a while, and restart the operation. Wait a few seconds between restarting the unit.
- **BUILT-IN CIRCUIT BREAKER** will cease the rotation if it senses irregularity.
- **AUTOMATIC SHUT-OFF** will stop the bur rotation when the handpiece is left unattended or remains in the same mode for 60 minutes (very effective when auto-cruising is used).

EXPLANATION OF SWITCHES AND CONTROLS

#	SWITCHES & CONTROLS	OUT Normal Position (not depressed)	IN (When Depressed)
1a	MAIN POWER SWITCH	DOWN: Power OFF	UP: Power ON and the BLUE BEAM illuminates on the Dial.
1b	FORWARD/ REVERSE ROTATION SWITCH	Forward rotation (shown with steady Blue Beam on the Speed Dial)	DEPRESSED: Reverse rotation (with pulsating Blue Beam)
1c	ACTIVATION SWITCH (MANUAL / FOOT MODE SWITCH) <u>Set this switch to FOOT Mode (not depressed) before turning the Main Switch ON.</u>	Foot Pedal activates and turns off the rotation <u>with Instant Stop.</u> If you have been operating manually, use this switch to turn off the rotation <u>with Instant Stop.</u>	<u>DEPRESSED: to activate the micromotor rotation manually at the speed set on the dial.</u> Always return to Foot mode for safety.
1d	ROTATIONAL SPEED DIAL with BLUE BEAM sets the maximum speed	Rotates the Speed Dial clockwise to increase the speed, and rotates counterclockwise to decrease speed, with the BLUE BEAM pointing to the speed.	Sets the maximum rotational speed for Foot Pedal, varying from $1,000 \text{ min}^{-1}$ through the selected maximum.
1e	CONSTANT / VARIABLE SWITCH on the rear panel	Normally DOWN for variable speed: MVFP Foot Pedal linearly varies the rotational speed from 1,000 through the user selected maximum speed on the dial.	UP for constant speed: Tap on the Foot Pedal to turn on Auto Cruise (at the selected speed on the Dial). Tap on the Foot Pedal again to stop Auto Cruise.



REAR PANEL OF THE POWER CONSOLE



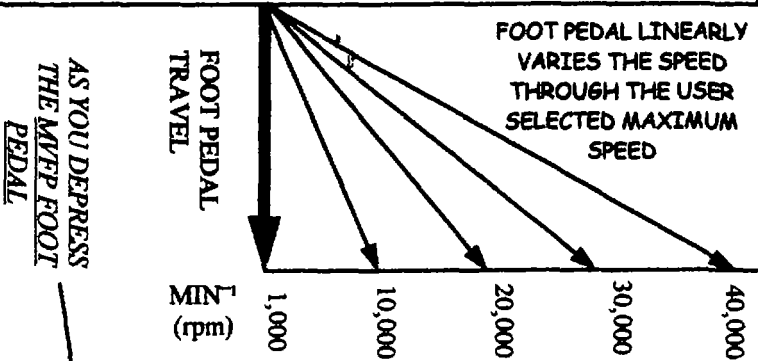
PERFORM A TEST RUN OF YOUR NEW HANDPIECE SYSTEM

- 1) Hold the handpiece assembly (with a test bur chucked in) in your hand or place it on the handpiece holder.
- 2) Make sure that the Manual Foot Switch is in "FOOT" mode (normal OUT position). Turn the Main Switch on. You will see the BLUE BEAM light up on the Speed Dial.
- 3) Rotate the Speed Dial counterclockwise all the way to the lowest speed and then clockwise to set the position of the BLUE BEAM at a safe speed for testing - around 10,000 min^{-1} (rpm).
- 4) Depress the MVFP Foot Pedal to activate the micromotor. Depress further to see how the speed increases. The speed will start from 1,000 min^{-1} (rpm) and linearly increase up to the speed pointed by the BLUE BEAM. The speed will never exceed the point that you set on the Speed Dial. The capacity speed is 40,000 min^{-1} .
- 5) Turn off the rotation with Instant Stop by simply releasing pressure from the Foot Pedal. If you have been operating without a foot pedal, turn the Manual / Foot Switch to normal Foot mode (OUT) to stop.
- 6) Depress the Rotational Switch to Reverse: You will see the BLUE BEAM pulsate. Tap the switch button back to Forward: The rotational direction changes to Forward very smoothly.
- 7) At the end of the day, make sure you turn off the power by turning the Main Switch to OFF.

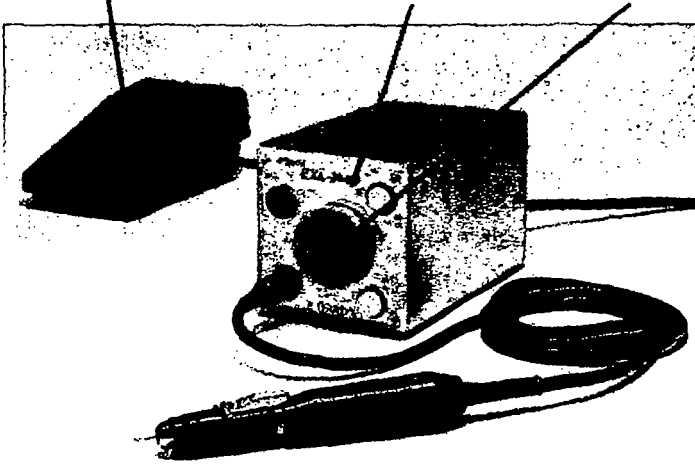
WARNING:

Do not attempt to open the power console or foot pedal, as there are no user-serviceable parts inside. Do not attempt to separate the cord from the micromotor. If you notice any irregularity, please contact **OSADA, INC.** for assistance in trouble shooting before sending the components for service.

MVFP FOOT PEDAL AND MAXIMUM SPEED



USER-SELECTED MAXIMUM SPEED (BLUE BEAM) ON THE SPEED



CORD HOLDER CLAMP (included in the accessory kit):

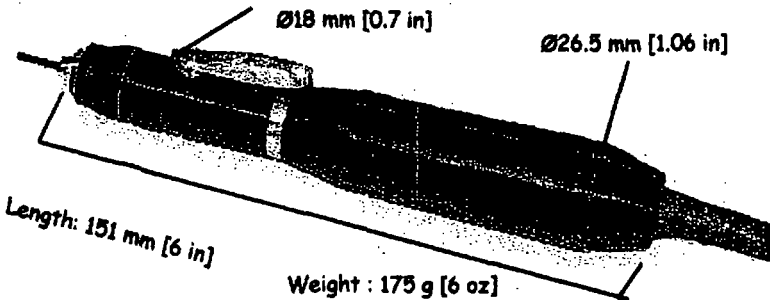
Since the MC12 Motorcord is straight, a cord holder clamp comes in handy to hold the unused length of the cord out of the way. Carefully bundle the excess length of the motorcord and place it in the clamp. The cord should be long enough for you to work comfortably without restricting your movements. Do not bend or strain the motorcord. (Try out the cord length before actually attaching the clamp with adhesive.)

Peel off the backing of the adhesive tape of the clamp and attach the clamp onto the side of the console or wherever convenient.

LHP12 / L12M-MC12

BRUSHLESS MICROMOTOR HANDPIECE ASSEMBLY

The LHP12 Handpiece Assembly is very ergonomic: small (6 in long), slender ($\varnothing 18 - 26.5$ mm), lightweight (6 oz) and perfectly balanced even when held with a pencil grip. With removable interchangeable chucks in 3 different shank sizes, different tasks can be performed effectively and comfortably.



SO QUIET AND SMOOTH: YOU MUST LITERALLY SEE IT TO BELIEVE IT!

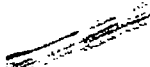
- Excellent concentricity provides vibration-free, accurate rotation.
- Almost silent rotational sound provides a more comfortable work environment. You should keep an eye on the BLUE BEAM on the speed dial because the rotational sound is deceptively quiet and smooth.
- Dust-shedding nose tip structure scatters shaven debris to minimize dust entering inside.
- Easy-to-open lever chucking system provides quick bur changes.
- Removable chucks provide easy cleaning and replacement of weak or vibrating chucks. Removable chucks are available in three different shank sizes: standard dental bur shank ($\varnothing 2.35$ mm), friction grip turbine bur shank ($\varnothing 1.6$ mm), and industrial bur shank ($\varnothing 3.0$ mm). (See next page for details.)
- The L12M Brushless Micromotor is completely sealed and virtually maintenance-free to provide long-lasting excellent performance (no carbon brushes to wear out).
- Change in rotational direction is smooth and immediate, and the pulsating BLUE BEAM reminds the user it is in Reverse Rotation.
- With sealed bearings, no lubrication is required: dusting is all that is needed.
- Compliance with EMC (European Standard) curbs the generation of electromagnetic waves that may cause malfunction of other electric and electronic equipment.

HANDPIECE LHP12 AND LEVER CHUCKING SYSTEM

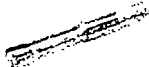


To open the chuck, turn the lever counterclockwise to the right until it is at a right angle to the handpiece. Pull out the bur. Place a bur into the open chuck and release the lever to secure the bur.

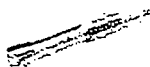
REMOVABLE CHUCKS IN 3 DIFFERENT (INTERCHANGEABLE) SHANK SIZES



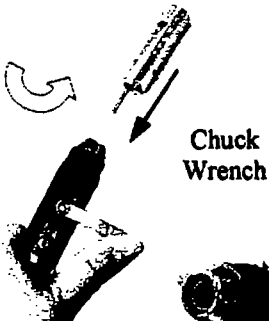
Standard Chuck
Shank $\varnothing 2.35$ mm,



Short Friction Grip
Turbine Chuck
Shank $\varnothing 1.6$ mm,



Industrial Chuck
Shank $\varnothing 3.0$ mm,



Chuck
Wrench

Insert the chuck wrench into the open chuck, matching the triangular shapes to engage. Push and twist the wrench counterclockwise to loosen the chuck. Unscrew and remove the chuck by rotating the chuck wrench. Clean the chuck with a brush.



Without
Chuck

To install a new or cleaned chuck, turn the handpiece lever to open position; insert the chuck held with the wrench; screw in securely while the lever is kept in the open position.



Spindle
Holder

Use the spindle holder if the spindle cannot be held with the lever in the open position. Insert the spindle holder tip end into the slots of the cone section, guiding the spindle (with the chuck closed) to click into the holder. Turn the lever to open the chuck, insert the chuck wrench, and proceed with the above instructions.

TROUBLE SHOOTING

SHOULD YOU FIND THE UNIT WORKING ABNORMALLY,

PLEASE CALL OSADA, INC., LOS ANGELES

TOLL FREE TELEPHONE NO. 1-800-426-7232.

IF ABNORMAL BUR ROTATION OCCURS, THE BLUE BEAM WILL PULSATE RAPIDLY AND THE CIRCUIT BREAKER MAY STOP THE ROTATION. CHECK THE UNIT AND REMEDY OBVIOUS PROBLEMS. OTHERWISE CALL OSADA, INC.

IF ABNORMAL PERFORMANCE OCCURS WITH THE FOOT PEDAL, IT MAY NEED SENSOR ADJUSTMENTS.